

REMARKS

Claims 1-26 were pending. Claims 11-26 have been withdrawn from consideration in response to a Restriction Requirement. Thus, only claims 1-10 are currently pending. Claim 1 has been amended. Support for the amendment can be found throughout the specification as originally filed, including on page 11, lines 16-19. No new matter has been introduced and no narrowing of claim scope is intended by this amendment.

***The Claim Rejections Under 35 U.S.C. § 103 Should Be Withdrawn***

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (US 5,919,864) or Lin et al. (US 6,255,372) or Ogawa et al. (US 4,711,285). Applicants respectfully traverse.

To establish a *prima facie* case of obviousness, three basic criteria must be met (MPEP 2142). First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or to combine the teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1981). In addition, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Both the suggestion and a reasonable expectation of success must be present in the references themselves.

Watanabe et al. (US 5,919,864)

The Examiner alleges that Watanabe teaches rubber compositions which incorporate applicants' instantly claimed diene elastomer in combination with the olefinic thermoplastic ingredient. The Examiner also claims that the applicants' fillers and vulcanization additives are shown in the Watanabe at columns 5 and 6. In view of the disclosure, the Examiner alleges the applicants' claims are rendered *prima facie* obvious.

Applicants disagree. Watanabe teaches a thermoplastic elastomeric composition comprising an elastomer and a thermoplastic resin containing syndiotactic polypropylene, wherein the elastomeric component is dispersed in the thermoplastic resin component forming the continuous phase. (col. 5, lines 25-28).

In contrast, in the present invention, the alpha-olefinic thermoplastic polymer is dispersed within the diene elastomer.

The present invention

The rubber composition of the present invention comprises (a) a diene elastomer, (b) 5 to 30 phr of an alpha-olefinic thermoplastic polymer, the melting point of which is greater than or equal to 150°C, the mean size by weight of these particles being between 30  $\mu\text{m}$  and 500  $\mu\text{m}$ , (c) more than 60 phr of reinforcing filler, (d) from 3 to 8 phr of sulphur, wherein the particles of thermoplastic polymer are dispersed within the diene elastomer (p.22, lines 16-19).

It is clear from the limitations in original claim 1 that the alpha-olefinic thermoplastic polymer is dispersed in the diene elastomer. Since the claim requires that the  $\alpha$ -olefinic thermoplastic polymer have a melting point greater than or equal to 150°C and the rubber

composition is prepared at a temperature less than 150°C, the polymer must be dispersed as particles within the diene elastomer. As the prior art does not teach a rubber composition having particles of thermoplastic polymer dispersed within the diene elastomer, the cited art does not render the present invention obvious.

Additionally, Watanabe does not teach or suggest 5 to 30 phr of an  $\alpha$ -olefinic thermoplastic polymer. Table II of Watanabe clearly indicates that the thermoplastic resin is the matrix phase and the elastomeric component is the dispersion phase. (See also col. 5, lines 2-9). As is well known to one of skill in the art, the part of the composite that is inside the matrix phase is referred to as the dispersion phase and the matrix phase is the part of the composite that completely encompasses the dispersion phase. Since the thermoplastic resin component as taught by Watanabe is the matrix phase, it comprises a large component of the composition. The amount in phr of thermoplastic resin in Table II ranges from 66 phr to 400 phr. Table II shows that the total amount of thermoplastic resin component disclosed by Watanabe, i.e. syndiotactic PP and/or Nylon 6 and/or PBT and/or isotactic PP, ranges from  $20+20=40$  pbw (Ex. 3) to  $40+40=80$  pbw (Ex. 1), whereas the corresponding elastomer component ranges from 20 pbw (Ex. 1) to 60 pbw (Ex. 3). Thus, for 100 pbw of elastomer, the amount of resin ranges from  $40 \times 100/60 = 66$  phr (Ex. 3) to  $80 \times 100 / 20 = 400$  phr (Ex. 1). The amount of thermoplastic resin disclosed is very high, in contrast to the 5 to 30 phr of thermoplastic polymer of the presently claimed rubber composition. Thus, for this additional reason, Watanabe cannot render the claimed invention obvious.

Moreover, the thermoplastic resin component discussed in Watanabe is syndiotactic polypropylene, which exhibits a melting point of 138°C, which is well below 150°C, contrary to the instant invention.

Furthermore, Watanabe teaches a rubber composition comprising very small amounts of sulfur, ranging from 0.23 to 0.7 phr. (See Table II). In contrast, the presently claimed rubber composition requires high amounts, i.e. 3-8 phr, of sulfur. Thus, for this additional reason, Watanabe does not render the claimed invention obvious.

Watanabe fails to teach each and every limitation of the present invention. Nor does Watanabe provide any suggestion or motivation to modify the rubber composition disclosed by Watanabe to arrive at the presently claimed rubber composition. Thus, one of skill in the art would have no expectation of success. As a result, applicants submit that claims 1-10 are patentable over Watanabe.

Lin et al. (US 6,255,372)

With regard to Lin, the Examiner alleges that Table 1 (col. 7) shows a tire composition which appears to be the same as that claimed by the applicants. In view of the disclosure, the Examiner alleges that it would be *prima facie* obvious to formulate the composition as claimed given each of the ingredients disclosed and is suggested to one of skill in the art that they be used in combination.

Applicants disagree. Lin teaches a rubber composition for improved tear strength comprising polypropylene, elastomer and an anhydride compatibilizing agent, that is prepared by using molten polypropylene. The polypropylene has a melt index of 12 g/10 min. (col. 7, line 48). As is well known to one of ordinary skill in the art, the melt index or melt flow index measures the rate of extrusion of molten resins through a die of specified length and diameter, under prescribed conditions of temperature, load, and piston position in the barrel, as the timed measurement is being made. Melt Flow Index, per ASTM D-1238, measures flow rates of

thermoplastics by extrusion plastometer. Since the polypropylene is in a liquid form, the rubber composition obtained cannot comprise a dispersion of polypropylene particles in the elastomer. In the present invention, the thermoplastic polymer is presented to the elastomer in a powder form to arrive at the rubber composition.

Furthermore, the use of molten polypropylene indicates that the polypropylene cannot be in particular form and cannot have a mean size by weight of between 30 and 500  $\mu\text{m}$ . Thus, for this additional reason, the claims are not rendered obvious by Lin.

In addition, Lin teaches the addition of very small and conventional amounts of sulfur, i.e. 1.3 phr, (Table I) to the rubber composition, which is far below the required amount of 3-8 phr recited in claim 1. The exemplary composition of Table I also comprises a small and conventional amount of reinforcing filler of 45 phr, which also teaches away from the high amount of greater than 60 phr of instant claim 1. Thus, for these additional reasons, the claims are patentable over Lin.

Lin does not teach a rubber composition comprising:(a) a diene elastomer, (b) particles of an  $\alpha$ -olefinic thermoplastic polymer having a melting point greater than or equal to 150°C, in an amount of 5 to 30 parts by weight per 100 parts diene elastomer (phr), wherein the mean size by weight of the particles is between 30  $\mu\text{m}$  and 500  $\mu\text{m}$ , (c) greater than 60 phr of reinforcing filler, and (d) from 3 to 8 phr of sulphur, wherein the particles of thermoplastic polymer are dispersed into the diene elastomer. Thus, Lin fails to teach each and every limitation of the present invention. In addition, there is no suggestion or motivation to modify the rubber composition disclosed by Lin to arrive at the presently claimed rubber composition. Thus, one of skill in the art would have no expectation of success. As a result, applicants submit that claims 1-10 are patentable over Lin.

Ogawa et al. (US 4,711,285)

The Examiner alleges that the disclosure teaches compositions which render obvious applicants' instantly claimed invention at col 5, lines 40+. As a result, the Examiner contends that applicants' instantly claimed invention is rendered *prima facie* obvious.

Ogawa teaches a rubber composition for a bead filler comprising short fiber of a thermoplastic polymer to render the rubber composition anisotropic. Preferably, the thermoplastic polymer has an acid amide bond. (col. 3, lines 42-49), e.g. nylon. To produce the rubber composition disclosed by Ogawa, the temperature is raised to 232°C to completely melt 6 Nylon. (col. 4, lines 8-14). However, raising the temperature and melting the thermoplastic polymer would not create a rubber composition that has a dispersion of thermoplastic particles in elastomer, as disclosed by the present invention.

Furthermore, Ogawa teaches away from a rubber composition of the present invention. The thermoplastic polymer, as taught by Ogawa, is to have a melting point above 200°C to impart a high strength to the short fibers made thereof and "with a tendency towards orientation crystallization with little possibility of forming spherulites" (see column 3, lines 50-54). In contrast, the presently claimed rubber composition comprises particles of thermoplastic polymer dispersed into the diene elastomer.

Lastly, Ogawa teaches that the mean diameter of the short fibers must not be greater than 1  $\mu\text{m}$  (col. 3, lines 9-10). In contrast to the present invention, the mean size by weight of the particles of thermoplastic polymer is between 30  $\mu\text{m}$  and 500  $\mu\text{m}$ . Thus, for this additional reason, the claims are not rendered obvious by Ogawa.

Ogawa does not teach a rubber composition comprising:(a) a diene elastomer, (b) particles of an  $\alpha$ -olefinic thermoplastic polymer having a melting point greater than or equal to 150°C, in an amount of 5 to 30 parts by weight per 100 parts diene elastomer (phr), wherein the mean size by weight of the particles is between 30  $\mu\text{m}$  and 500  $\mu\text{m}$ , (c) greater than 60 phr of reinforcing filler, and (d) from 3 to 8 phr of sulphur, wherein the particles of thermoplastic polymer are dispersed into the diene elastomer. Thus, Ogawa fails to teach each and every limitation of the present invention. In addition, there is no suggestion or motivation to modify the rubber composition disclosed by Ogawa to arrive at the presently claimed rubber composition. Thus, one of skill in the art would have no expectation of success. As a result, applicants submit that claims 1-10 are patentable over Ogawa.

Applicants respectfully request withdrawal of the rejection of claims 1-10 over Watanabe et al.. or Lin et al. or Ogawa et al.

CONCLUSION

Based on the foregoing amendments and remarks, Applicants submit that the present application is in condition for allowance. A Notice of Allowance is respectfully requested. Applicants request a two month extension of time and enclose herewith the required fee pursuant to 37 C.F.R. § 1.17(a)(2).

The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication to Deposit Account No. 02-4377. A duplicate copy of this paper is enclosed.

Respectfully submitted,  
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